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Regeneration After Clear-Cutting Second-Growth Northern Hardwoods

Regeneration after clear-cutting second-growth northern hardwoods is often unsatisfactory, in both quantity and species composition. A small area on the Bartlett Experimental Forest near Bartlett, N. H., provides a good example.

Condition At Time Of Cutting

This area (1.4 acres) was in a stand on an old pasture. In 1936 it was well stocked with an even-aged 60-year-old stand of red maple, white ash, paper birch, and aspen, with smaller amounts of yellow birch, sugar maple, and beech. That winter the stand was thinned; about 30 percent of the basal area was cut. Then in 1938 the hurricane blew down nearly all the trees on the study area. A year later, all stems 2 inches d.b.h. and larger were cut. Thus by stages the overstory was completely removed in 3 years.

Immediately after the 1939 clear-cutting, blackberry and raspberry were abundant over the entire cleared area. A dense stand (11,000 per acre) of small white ash was also present. The ash had seeded in after the thinning, but before the blowdown. There was also a heavy stand of small pin cherry, as well as a few larger but scattered beech, red maple, and sugar maple seedlings. There was very little advance growth of yellow birch, and no paper birch or aspen.

Reproduction was tallied on 80 milacres in four different parts of the clear-cut area. A 22-milacre strip near the edge of the clearing was fully exposed on the north side, but was somewhat protected by the adjacent thinned stand on the other three sides. The other three sample strips (58 milacres) were well within the clearing; they were fully exposed. These strips provided a good sample of the advance reproduction.

Forty percent of the milacres were stocked with one or more stems of timber species 3 feet or taller, and 58 percent had seedlings of the same species more than 1 foot

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high. Stocking was much better on the protected strip (table 1); 17 of the milacres (77 percent) had reproduction of timber species at least 1 foot high.

Table 1.--Reproduction at clear-cutting and 10 years later

Location of sample strip	Milacres	Milacres stocked			
		1939		1949	
		3 feet high	1 foot high	6 feet high	3 feet high
	Number	Percent	Percent	Percent	Percent
Protected	22	59	77	86	86
In open	58	33	50	34	62

10 Years Later

Reproduction was tallied again on the same sample strips in 1949. On the protected strip, 19 of the 22 milacres had crop trees 6 feet or more in height; 8 beech, 8 sugar maple, 2 red maple, and 1 paper birch. The milacres that did not have 6-foot crop trees were more exposed, in the center of the strip.

On the open strips, only a third of the sample milacres were stocked with trees 6 feet or taller. White ash reproduction was found here; so was one white pine seedling. Otherwise the same species were found as on the protected strip (table 2). The stocking in 1949 was only a little greater than the amount of advance reproduction in 1939.

The importance of "established" advance reproduction is well illustrated on this area. Although white ash had been abundant in 1939 (mostly as 1- or 2-year seedlings less than a foot high), a few survived after clear-cutting. There was little paper birch or yellow birch 10 years after clear-cutting, in spite of plentiful seed trees.

The timber species apparently could not compete with the rank growth of blackberries and raspberries that came in after the 1936-37 thinning and developed fully after the

Table 2.--Reproduction on open milacres, 1949

Species	Stocked with trees--	
	6 feet high	3 feet high
	Milacres	Milacres
Beech	4	4
Yellow birch	1	1
Sugar maple	6	11
Red maple	3	3
Paper birch	1	1
White ash	4	15
White pine	1	1
Unstocked	38	22
Total	58	58

hurricane. Very open stand conditions would otherwise have been favorable to regeneration, especially of birch.

All together, stocking on this clear-cut area was poor in 1949; regeneration was retarded at least 10 years. There were few dominant crop trees in the center of the area. The smaller trees were still in competition with raspberries and blackberries. The stocking of timber species was good around the edges of the clearing and was gradually working in toward the center, but the berries were still the dominant cover over most of the area.

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